What is claimed is:

1. A fluid coupler comprising:

a female coupler member having a first fluid passage and a male coupler member receiving hole having an axis; and,

a male coupler member having a second fluid passage, the male coupler member being inserted into said male coupler member receiving hole along said axis so that the male coupler is brought into a fixed connection condition in which the male coupler is fixedly connected to said female coupler member and retained at a fixed connection position relative to said female coupler member; the fixed connection condition being cancelled or broken when an excessive tension is applied to a fluid line in which the fluid coupler member is installed such that said tension acts on the male and female coupler members to separate them;

said female coupler member having an interior surface extending in parallel with said axis and defining said male coupler member receiving hole;

said first fluid passage having an end opening at said interior surface;

said male coupler member having an exterior surface extending in parallel with said axis ;

said second fluid passage having an end opening at said exterior surface of said male coupler member;

said coupler further comprising:

a first valve movably connected to one of said male and

female coupler members and positioned between said exterior surface of said male coupler member inserted into said male coupler member receiving hole and said interior surface of said female coupler member, said first valve having an outer surface and an inner surface to be slidably engaged with said interior surface and said exterior surface, respectively; and,

a through hole having an outer end opening at said outer surface and an inner end opening at said inner surface;

under said fixed connection condition, said outer and inner ends of said through hole are aligned with said one end of said first fluid passage and said one end of said second fluid passage, respectively, to effect fluid communication between said first and second fluid passages;

said fluid communication between said first and second fluid passages via the through hole being cancelled due to loss of said alignment of said ends of said though hole with respect to at least one of said one ends of said first and second fluid passages, which is caused when said male coupler member is moved in a direction opposite to the direction of insertion of the male coupler member into said female coupler member after cancellation of said fixed connection condition.

2. A fluid coupler as set forth in claim 1 wherein:

said first valve is mounted on said interior surface of said female coupler member,

said female coupler member comprising a spring member urging said male coupler member inserted into said male coupler member receiving hole to hold said male coupler member at said

fixed connection position.

3. A fluid coupler as set forth in claim 2 wherein:

said second fluid passage of said male coupler member comprises

an axially extending portion, and

a radially extending portion extending from said axially extending portion to said one end of said second fluid passage;

said male coupler member further comprises

a second valve slidably received in said axially extending portion of said second fluid passage; and,

said second valve effects a fluid connection between said radially extending portion and said axially extending portion of said second fluid passage under said fixed connection condition and blocks said fluid connection when said male coupler member is moved in the direction opposite to the direction of said insertion of said male member.

4. A fluid coupler as set forth in claim 2 or 3 wherein

said interior surface of said female coupler member and said exterior surface of the male coupler member are circular in cross section thereof centering around said axis of said male coupler receiving hole; and,

said first valve positioned between said interior surface and exterior surface is cylindrical and circular in cross section.

5. A fluid coupler as set forth in any one of claims 2-4 wherein

said fluid coupler further comprises a first locking member engaged with said first valve and said male coupler member to prevent relative movement between the first valve and said male

coupler member; and,

said first locking member is allowed to move radially outwardly to engage with said first valve and said female coupler member when said first valve and said male coupler member have been moved a predetermined distance from said fixed connection position in the direction opposite to the direction of said insertion of said male coupler member so that said male coupler member is permitted to continue the movement from said fixed connection position displacing said locking member radially outwardly while said first valve is prevented from continuing the movement from said fixed connection position by the first locking member which has been displaced radially outwardly to engage with said first valve and said female member.

6. A fluid coupler as set forth in claim 5 further comprising:
a locking member retaining member engaging with said first locking member and, when said locking member has been displaced radially outwardly by said male coupler member, said locking member retaining member prevents said locking member from moving back in a radial inward direction.

7. A fluid coupler as set forth in claim 6 wherein

said locking member retaining member is urged by said spring member and movable in the direction of said insertion of said male coupler member so that said locking member retaining member urges said male coupler member and said first valve toward said direction of insertion of said male coupler member through said first locking member while said first locking member is engaged with both said first valve and said male coupler member.

8. A fluid coupler as set forth in claim 7 wherein

said fluid coupler comprises:

a locking member support member provided between said first valve and said male coupler member and adapted to be moved relative thereto in a direction parallel to said axis; and,

a second locking member engageable with said locking member support member and said male coupler member to enable them to move together in a direction parallel to said axis; and

upon said movement of said male coupler member from said fixed connection position, said locking member support member is moved together with the male coupler member and brought to a position radially inside said first locking member to engage the same after said male coupler member passes said first locking member and displaces it radially outwardly and,

when said locking member support member is brought into said position inside said first locking member, said second locking member is permitted to be moved radially outwardly to enable said male coupler member to continue the movement from said fixed connection position displacing the second locking member radially outwardly, said second locking member displaced radially outwardly by said male coupler member being engaged by both said locking member support member and said female coupler member to thereby prevent said locking member support member from moving together with said male coupler member.

9. A fluid coupler as set forth in claim 1 wherein

said female coupler member is of tubular shape, and has forward and rearward ends and a partition wall positioned between said forward and rearward ends, said forward end facing said male coupler member;

said male coupler member receiving hole extends from said forward end towards said rear end and terminates at said partition wall;

said first fluid passage comprises a first portion extending from said rearward end and terminates at said partition wall, and a second portion extending from said first portion and radially outside said partition wall and reaching and opening at said interior surface of said female coupler member defining said male coupler member receiving hole;

said interior surface of said female coupler member and said exterior surface of said male coupler member are circular in cross section thereof centering around said axis of said male coupler member receiving hole;

said first valve is of a circular tubular shape;

said male coupler member has a forward end facing said female coupler member and a rearward end;

said second fluid passage of said male coupler member comprises an axially extending portion extending from said rear end towards said forward end thereof, and a radially extending portion extending from said axially extending portion to said one end of said second fluid passage;

said male coupler member has a second valve slidably received in said axially extending portion of said second fluid passage, and a valve spring urging said second valve towards said forward end of said male coupler member;

said second valve has a stem extending through said forward end of said male coupler member which stem is adapted to be abuttingly engaged with said partition under said fixed connection condition to shift the second valve relative to said male coupler member towards said rear end of said male coupler member compressing said valve spring to allow said axially extending portion and radially extending portion of said second fluid passage to be fluidly connected to each other; and,

said valve spring retains said second valve in a condition that said stem is engaged with said partition until said male member engages and moves said second valve in the direction of said insertion of said male member after said male coupler member moves from said fixed connection position so that said second valve blocks the fluid communication between said axially extending portion and said radially extending portion of said second fluid passage.

10. A fluid coupler as set forth in claim 9 wherein

said fluid coupler further comprises a first locking member engaged with said first valve and said male coupler member so as to prevent said first valve and said male coupler member from moving relative to each other in a direction parallel to said axis; and,

said first locking member is allowed to move radially outwardly to engage with said first valve and said female coupler member when said first valve and said male coupler member have been moved a predetermined distance from said fixed connection position in the direction opposite to the direction of said insertion of said male coupler member so that said male coupler member is permitted to continue the movement from said fixed connection

position displacing said locking member radially outwardly while said first valve is prevented from continuing the movement from said fixed connection position by the first locking member which has been displaced radially outwardly to engage with said first valve and said female member .

11. A fluid coupler as set forth in claim 10 further comprising:

a locking member retaining member engaged with said first locking member and, when said locking member has been displaced radially outwardly by said male coupler member, said locking member retaining member prevents said locking member from moving back in a radial inward direction

12. A fluid coupler as set forth in claim 11 wherein

said locking member retaining member is urged by said spring member and is movable in the direction of said insertion of said male coupler member so that said locking member retaining member urges said male coupler member and said first valve toward said direction of insertion of said male coupler member through said first locking member while said first locking member is engaged with both said first valve and said male coupler member.

13. A fluid coupler as set forth in claim 12 wherein

said fluid coupler comprises:

a locking member support member provided between said first valve and said male coupler member and adapted to be moved relative to the first valve and said male coupler member in a direction parallel to said axis; and,

a second locking member engageable with said locking member support member and said male coupler member to

enable them to move together in said direction; and,

upon said movement of said male coupler member from said fixed connection position, said locking member support member is moved together with the male coupler member and brought to a position radially inside said first locking member to engage the same after said male coupler member passes said first locking member displacing it radially outwardly; and,

when said locking member support member is brought into said position inside said first locking member, said second locking member is permitted to be moved radially outwardly to enable said male coupler member to continue the movement from said fixed connection position displacing the second locking member radially outwardly, said second locking member displaced radially outwardly by said male coupler member being engaged by both said locking member support member and said female coupler member to thereby prevent said locking member support member from moving together with said male coupler member.